



Centerline

April 2001

Issue No. 5

An Environmental News Quarterly, From the NCDOT Natural Systems Unit

Design-Build for NCDOT

By: Len Hill Deputy Highway
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Design-build is an alternative project delivery method that differs from the traditional design-bid-build method. In the traditional method, projects are planned, 100% designed, and awarded to a low-bid contractor who in turn constructs the project. With design-build a project is planned, partially designed from 10% to 65% and then awarded to a contractor-design firm team using an evaluation process. The selected contractor-design team then completes the design and constructs the project. In design-build the project planning phase documents and the public involvement process is completed using normal North Carolina Department of Transportation (NCDOT) procedures before the project is awarded to a design-build team.



Design-build has been used for many years in the building industry. However, it is a relatively new for the transportation industry having been in use for the last five years. Design-build is now being used for selected transportation projects in about thirty states. The type of projects using design-build range from bridge replacement and resurfacing projects to a \$1.2 billion reconstruction of the interstate system in Salt Lake City, Utah. NCDOT has used the design-build procurement method on two recent projects; an ITS-signal system in Charlotte and a railroad bridge replacement in Morehead City.

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The Dwarf-flowered Heartleaf Prefers a Good Bluff

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When environmental studies begin for a proposed highway project, it is standard operating procedure for the North Carolina Department of Transportation (NCDOT) to conduct surveys for endangered species in the project area. The Dwarf-flowered Heartleaf (*Hexastylis naniflora*) can be found in various regions of North Carolina and is listed by the U.S. Fish and Wildlife Service as protected under Sections 7 and 9 of the Endangered Species Act of 1973.

The Dwarf-flowered Heartleaf is an evergreen that flowers between mid-March to early June. The flowers are needed to identify the plant. This plant has the smallest flowers of any North American plant in its genus, *Hexastylis*. The flower color usually ranges from beige to dark brown, but can appear to be shades of green or purple. The leaves are heart shaped dark green and leathery. The plant stalks are long and thin, with a thick main root similar to ginger.

Specific site conditions are required for the Dwarf-flowered Heartleaf to thrive. These conditions are usually found in the upper Piedmont regions of North and South Carolina. This plant grows in acidic, sandy loam soils along bluffs and nearby slopes, in boggy areas adjacent to creek heads and streams, and along the slopes of hillsides and ravines. The most important habitat requirement is soil type, although lots of sunlight is required for maximum flower production. The specific site conditions are one of the parameters that make the Dwarf-flowered Heartleaf rare.

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Why use design-build? The major advantage to using design-build is to reduce project development time and complete a project in less time. Current project delivery times from beginning an environmental report to completing construction range from seven years on widening projects to fourteen years for major new location projects. Local officials and the public are demanding faster delivery of transportation projects. The interstate reconstruction in Salt Lake City must be complete before the 2002 Winter Olympics. Design-build allowed the Utah DOT to combine design and construction thus reducing delivery time. This approach was their only opportunity to meet the 2002 deadline. There is also the possibility of cost savings on projects with complex construct ability issues. By combining the designer and the contractor, there is greater opportunity to construct the project in a more efficient and less costly manner. Another advantage is reducing NCDOT manpower needs for design and construction personnel. This advantage is particularly helpful in today's environment of hiring freezes and staff shortages.

In the traditional design-bid-build the projects are advertised and awarded to a contractor using the low bid process. Most design-build procurement methods use a best value process that combines low bid and qualifications. North Carolina will use a best value method using a two-step selection process. NCDOT will advertise a request for qualifications (RFQ) in which the contractor-design team submits their qualifications. The department will short-list the applicants selecting three applicants. The selected applicants will then submit a proposal detailing their method for design and building the project. A NCDOT evaluation team will rate the applicants based on their qualifications and proposal. Then the three applicants will submit a bid. The applicant having the best combination of the highest ratings and low bid will be awarded the project.

In 1998 the North Carolina General Assembly gave NCDOT the authority to use design-

build on three projects per calendar year. In February 2000 the Board of Transportation adopted detailed guidelines for awarding projects using the design-build procurement method. For calendar year 2001 three projects for design-build have been selected. These projects are 1) the widening and resurfacing of I-26 in Henderson County (I-4400); 2) the widening and resurfacing of I-77 in Mecklenburg County (I-3311A); and 3) the resurfacing of US 421 in Forsyth County (U-2827C). The estimated cost of the I-26 and I-77 projects are \$50 million plus. The estimated cost of the US 421 project is in the \$10 million range. All three projects have no right of way or utility conflicts and permit needs are minimal. It is the department's intent to start with projects that avoids right of way, utilities, and major permit impacts. However, as we gain experience and our comfort level increases, future projects will involve these areas.

The major challenge to using the design-build method in North Carolina is navigating through the environmental permit issue. Most DOT agencies using design-build obtain the environmental permits before a project is awarded. The department is committed to following this procedure as well. On normal design-bid-build projects we have near 100% design when the permits are applied for and obtained. In design-build the average project is 30% completed when awarded. Our challenge is to work with the resource agencies and develop a process to obtain timely permit approvals using the design-build procurement method.

A primary mission of the NCDOT is to deliver cost effective and quality transportation projects on schedule. The department will continue to use the traditional design-bid-build method on most projects. In 2000, we awarded 202 projects using this method and anticipate a similar amount in 2001. We will use the design-build method on three projects. However, as our customers demand faster delivery of transportation projects, design-build is another tool to deliver projects in a more timely manner.

Bat Survey and Management Training

By: Jeffrey Burleson
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The North Carolina Department of Transportation (NCDOT) is making a conscious effort to protect North Carolina's federally threatened and endangered species. The federally endangered Indiana bat (*Myotis sodalis*) has been found throughout the United States in 27 states, including the mountain physiographic province of North Carolina. In certain instances, transportation improvement projects may impact summer roosting habitat for the Indiana bat.



Jeff Burleson

In August 2000, NCDOT Biologists, Logan Williams and Jeff Burleson attended an intensive 6-day and 5-night comprehensive bat conservation and management workshop in Barree, Pennsylvania. This workshop provided valuable techniques and skills in bat surveying and management, and consisted of lectures, discussions, field trips to view bat habitat resources, and hands-on training to capture and identify bats. Workshop participants gained experience using the latest surveying and study equipment, including: mist-nets, harp traps, night vision scopes, bat detectors, radio-tracking devices, light tagging, and bat recording equipment, and other equipment/resources. Techniques to identify summer and winter habitats were also reviewed.



Logan Williams

In January 2001, Logan Williams and Jeff Burleson visited Kentucky to assist state and federal researchers in conducting surveys. The state and federal researchers employed by US Fish and Wildlife Service, US Forest Service, Missouri Department of Natural Resources, Kentucky Department of Natural Resources, and a private affiliate, Bat Conservation International, conducted winter hibernaculum surveys (limestone and sandstone caves). The surveys for the Indiana bat,

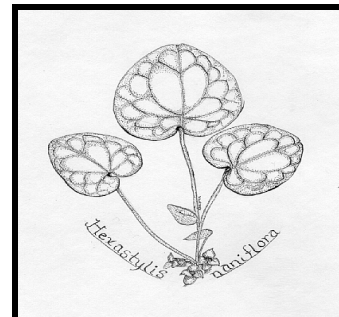
gray bat (federally endangered), and eight other bat species were conducted in several locations, including Carter's Caves State Park and Mammoth Cave National Park.

The NCDOT is striving to protect federally threatened and endangered resources and will benefit from the recent training. NCDOT biologists will continue gathering knowledge and gaining experience in bat surveys and management as a means to better protect the Indiana bat from extirpation in North Carolina.

(Heartleaf Continued from page 1)

However, timber harvesting, urbanization, conversion from woodlands to pasture, pond and/or reservoir construction, trash and insecticide use can threaten this species.

The NCDOT is proposing to construct a bypass around the city of Shelby in Cleveland County. As part of the planning and environmental study, surveys for endangered species, such as the Dwarf-flowered Heartleaf, were conducted for each study corridor. As a result of the survey, a total of 36 sites, or group of plants growing closely together were identified and marked. The next step will be to consult with the U.S. Fish and Wildlife Service to determine the severity of the impacts and identify steps to assure the Heartleaf's future. Avoidance and minimization methods will be given the highest priority. An additional survey of the area surrounding the study corridors will be conducted to determine if any more plants exist. The results of this additional survey will be available for the consultation with the U.S. Fish and Wildlife Service.



Permits on the Back Roads

By: Roger Bryan
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DEO Perspective: Featuring an article from a Division Environmental Officer. This quarter's segment is brought to us by Division 13, located in the Western reaches of the state.

The North Carolina Department of Transportation (NCDOT) secondary roads program was initiated during the early 1960s. Since that time, NCDOT has improved and paved many of the existing dirt and gravel "back roads." The environmental climate has changed significantly since the inception of this program. Many projects now require field surveys and federal/state permits prior to construction.

As Environmental Officer (DEO) for the Division 13 Office in Asheville, my responsibilities include environmental assessment of these secondary road projects to ensure compliance with current state and federal rules and regulations. The duties may include surveys for threatened/endangered species and wetland delineation. However, these technical aspects are just a part of the overall evaluation of these projects. The other critical part is the coordination between NCDOT engineers, DEO's, and resource agencies. The ability to transform information from diagrams to potential impacts on streams and wetlands is cru-

cial. Once the information is assimilated, the process of consultation with resource agencies (Corps, Division of Water Quality, NC Wildlife Resources Commission) can begin and necessary permits obtained.

The challenge for the Environmental Officer is to ensure compliance of these projects and acquire necessary permits in a timely manner. A critical step to facilitate the process is the establishment of an atmosphere of cooperation with the resource agencies. The ability to be flexible and work with resource agencies on projects is an invaluable asset to NCDOT. Modifications to project designs may actually benefit the resource agencies and NCDOT.

The DEO program has provided a necessary compliment to the Division's daily operations and has been met with the utmost in cooperation from NCDOT and resource agency personnel. The added technical expertise and liaison role will undoubtedly streamline the environmental assessment process within the Divisions.

CEC/NCDOT Joint Training

By: V. C. Bruton, Ph.D., Manager, Natural Systems Unit

The N.C. Department of Transportation (NCDOT) and Consulting Engineers Council (CEC) held a joint training workshop on permits, permit drawings and mitigation on March 20, 2001 at the Jane S. McKimmon Center, NCSU. The workshop included an overview on permits and stream buffer regulations, permit drawing requirements, mitigation for impacts and permit case studies. The eighty workshop participants included planners and designers from NCDOT and private industry. NCDOT staff members making presentations included: Alice Gordon, Mike Wood, Marshall Clawson, P.E., LeiLani Paugh, Randy Turner, Mark Clifford, P.E., and Dave Schiller. Consultants participating in the workshop were Barney O'Quinn, P. E., ARCADIS Geraghty & Miller; Jenny Summerlin, P. E., Barbara H. Mulkey Engineering; and Joe Pfeiffer, KCI Technologies. Co-chairs for the training session were Jay A. Bennett, P. E., NCDOT and Roy Bruce, P. E., H W Lochner.

Lengyel Mitigation Site-”The Southern Pearl”

By: Phil Harris

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As part of the planning and environmental studies for the US 17 bypass of New Bern, the North Carolina Department of Transportation (NCDOT) developed a mitigation plan to compensate for the loss of wetlands. In the spring of 1996, NCDOT performed a preliminary ecological assessment of the Lengyel wetland mitigation site located in New Bern, Craven County. This site which is named for the original landowner, is located along the Neuse River in the southern quadrant of the US 17 bridge crossing at New Bern. Because of its location and proximity to the traveling public, the Lengyel site has served as a flagship for the NCDOT wetland program. The Lengyel site was initially selected for evaluation because of the onsite, in-kind mitigation potential for wetland impacts associated with the US 17 improvement project. Historical aerial photography provided by NCDOT (1961, 1970, 1989, and 1996) was used to identify recent alterations affecting the site and to evaluate land use trends during the past 35 years.

The peninsula was originally developed in the late 1890s to support a sawmill, lumber storage area, and lumber-shipping port. Several brick structures associated with the sawmill were constructed within the site. The sawmill ceased operation in the mid-1920s and fell into disrepair. Scattered bricks, other building debris, and sawdust marked locations of the milling operation within the site.

The Lengyel site served as a deposition area for dredged material collected from the barge docks and shipping ways. The peninsula landscape has been subject to excavations, deposition of fill material, impoundment construction, and grading activities that have occurred over the last century or more. The age of trees within the depression indicate that it was excavated in the mid-1970s,

probably in association with a dredging operation in the Neuse River.

Upon completion of implementation activities, the Lengyel Mitigation Site will provide 13.198 acres brackish marsh restoration/preservation. Mitigation goals for the site include approximately 6.54 acres of brackish marsh restoration, 5.25 acres of brackish marsh preservation, and 0.85 acres of upland buffer.

In order to demonstrate successful mitigation, the Lengyel site is monitored for hydrology and vegetation. The site has been monitored for two years. Listed below is the implementation timeline.

April 1998.....	Site Construction Began
April 1998.....	Site planted (Phase I)
March 1999.....	Surface Water Gauges Installed
April 1999.....	Hydrologic Monitoring Began
April 1999.....	Planting Completed
June 1999.....	Site Construction Finished
October 1999.....	Vegetation Monitoring (1 year)
November 1999.....	First Year Hydrologic Monitoring (end)
March 2000.....	Second Year Hydrologic Monitoring (begin)
August 2000.....	Vegetation Monitoring (2 year)
October 2000.....	Two Groundwater Gauges Installed

Salutations

The Natural Systems Unit wishes to express its sincere appreciation to Ms. Linda Hilton-Cain for her assistance in the early development of the Centerline. Her involvement was instrumental in the establishment of the Natural Systems Newsletter.

Because of her new duties as an Administrative Officer II with the Public Involvement and Community Studies Section, PDEA Branch, Linda has relinquished her role in the publishing of this newsletter.

Rocky Branch Stream Restoration Project

By: Barbara Doll, P.E., North Carolina Sea Grant, North Carolina State University

The North Carolina Department of Transportation is providing a major financial boost to the restoration of Rocky Branch, a creek running through the heart of the North Carolina State University campus. With a \$1,688,000 federal transportation enhancement grant commitment and \$1,450,000 in pending stream mitigation funds to be allocated to the project, NCDOT will give a major boost to the plan to stabilize the degraded stream, improve water quality, and build a greenway through the campus. Phase 1 of this project, which could become a model for urban stream restoration, is expected to get under way this spring. North Carolina Sea Grant and NC State University are spearheading the restoration project.

Rocky Branch drains into Walnut Creek, a tributary of the Neuse River. In 1978 the Division of Water Quality classified Rocky Branch as the state's most polluted urban stream. The stream was channelized, its floodplains filled and has experienced heavy development within its drainage area. As a result, the stream suffers from severe erosion and is an unsafe eyesore on the campus.

The Rocky Branch Project will employ natural channel design techniques and innovative storm water controls that offer greater long-term stability for repairing streams. It will include the expansion of the riparian corridor along the stream to improve water quality and increase habitat for urban wildlife. The installation of a 6,100-foot greenway from Gorman Street to Pullen Park will provide an alternative transportation path and recreation opportunity.

The transportation enhancement funding will be used for greenway path construction, landscaping and the expansion of two roadway crossings. The roadway work will not only increase the creek's floodplain capacity, but also will enable pedestrians to pass safely beneath the heavily trafficked roads. The upgrade of Pullen Road also will provide a connection to Pullen Park and the City of Raleigh's greenway system.

Urban development has taken its toll on creeks, streams and rivers across the nation. Park-

ing lots, roads and rooftops cause storm water to course through stream channels, causing the erosion of stream banks, contributing a large portion of sediment load in many stream systems. In addition, culvert pipe, concrete and riprap used to control erosion accelerates flow, often transferring erosion problems further downstream.

The project has galvanized support from many agencies and from across university disciplines, including the School of Design, the Marine, Earth and Atmospheric Sciences and Zoology departments, and N.C. Cooperative Extension.

The DOT funding is a very important part of the overall funding for this project. The DOT funding is essential to completing the \$4.9 million stream restoration project. The other funding pieces include a \$1.123 million Clean Water Management Trust Fund grant for stream restoration and the installation of storm water filtration systems to treat runoff that drains into the creek; a \$55,700 grant from the Environmental Protection Agency towards the repair of the upstream portion of Rocky Branch, building an educational campus greenway, and surveying the stream's invertebrate inhabitants; a \$500,000 commitment from the university to help restore the stream and build the greenway; and a \$136,000 allocation from FEMA for Hurricane Fran damage relief.



Staff Wades Into Stream Course

By: Greg Jennings, Ph.D., P.E.

Dr. Jennings is an Associate Professor of Biological & Agricultural Engineering at NC State University. He was responsible for coordinating the workshops through the NCSU Stream Restoration Institute.

In January, thirty-five staff members from the North Carolina Department of Transportation (NCDOT) participated in a four-day workshop on stream restoration at N.C. State University (NCSU). The instructors were faculty members from NCSU's Stream Restoration Institute, an interdisciplinary group focused on education and applied research to promote natural channel design approaches to restoring and enhancing streams and rivers. The workshop was funded by a 1999 grant from NCDOT to evaluate restoration techniques applicable to North Carolina streams.

Workshop topics included the Rosgen stream classification system, stream condition assessment, causes of stream instability, restoration options, case studies of North Carolina projects, reference reach



surveys, and natural channel design processes. In addition to daily classroom sessions, workshop participants visited local streams each day to collect data

and observe construction of two active restoration projects in the Raleigh area. Participants learned about stream channel geometry measurements, design and installation of in-stream boulder and log structures, streambank stabilization techniques, and riparian vegetation management. All of these project components are essential to successfully restore the natural functions of impaired stream systems.

The case studies were valuable in helping staff members understand what is involved in project planning, design, construction management, and monitoring. These studies also provided information about project costs for various types of restoration in several different landscape settings. For example, urban stream projects may be much more expensive than rural projects due to land use constraints, utilities, road crossings, and construction management is-

sues. Participants also learned that watershed size and length of restored channel greatly affect the complexity and cost of stream projects.

NCSU's Stream Restoration Institute continues to provide educational workshops, project tours, conferences, and publications to teach agencies, consultants, and landowners about stream restoration. Learn more about these educational opportunities on the SRI web site <http://www5.bae.ncsu.edu/programs/extension/wqg/sri/>.

Hal Bain Elected to Non-Game Advisory Committee Leadership Position

By: V. C. Bruton, Ph.D.

Manager, Natural Systems Unit

Mr. Hal Bain, a NCDOT Natural System's Biologist and Bio-Team Leader, was recently elected Chairman of the N.C. Wildlife Resources Commission (WRC) Non-Game Advisory Committee. This committee makes recommendations to the Wildlife Resources Commission on Non-Game species and habitat issues. The eighteen committee members consist of scientists and conservation leaders from a variety of professional backgrounds in North Carolina.



Hal, NCDOT's representative to the Non-Game program is currently serving in his second 3-year term on the committee. He was initially appointed in August 1996. By virtue of his new leadership position on the committee, Hal will attend monthly commission meetings.

Mr. Bain joined the NCDOT staff in 1992 as an Environmental Biologist. A native of Buies Creek, he received his BS degree from Campbell University (Biology, 1985) and an MS degree from UNC Wilmington (Marine Biology, 1989). In addition to being a competent and respected biologist, he is an avid hunter and fisherman who has a great love and appreciation for the outdoors. In his current position as Bio-Team leader in the Natural Systems Unit he supervises a team of environmental professionals in various types of project assignments. Hal and his wife Allison, live in Angier, North Carolina and have two children, Kyle and Anna.

Congratulations Hal on your recent appointment and the service you render to our state's transportation and natural resources program.

Project Spotlight: T.I.P. A-9, Relocation of US 74 in Graham and Swain Counties

By: Phillip Todd
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As part of the Appalachian Development Highway Program Section of the 1973 Highway Improvement Program, the Congress authorized the relocation of US 74 through the mountainous terrain of Swain and Graham County (TIP No. A-9). The NCDOT had plans to let a widening section of this ambitious project (TIP No. A-9 DD). Application had been made for Section 404/401 just after a population of the Indiana bat (*Myotis sodalis*) was found in Graham County during summer 1999.

The last recorded sighting of Indiana bat in North Carolina was 1991. The NCDOT initiated a survey for the bat in the project impact area during the bat's summer roosting time; fortunately, no bats were found in the project area. However, due to potential habitat for the bat in the project area, the Section 404 permit included the restriction of not cutting potential roost trees from October 15 to April 15.



There is also a high potential of encountering acid rock as a result of project construction in

this mountainous area. The NCDOT has been conducting water sampling for pH in project area streams for several years. A contingency plan has been developed by NCDOT in the event that acid rock is encountered during project construction. The USACE conditioned the Section 404 for TIP No. A-9 DD such that the monitoring continues and the resource agencies receive monthly reports on pH in project area streams.

The NCDOT is currently conducting a Draft Reevaluation of the EIS for two other sections for the project, TIP No. A-9 B and C. The NCDOT will be conducting surveys for the Indiana bat this summer to determine the potential of the bat for these two sections. These sections total 10 miles in length. The NCDOT is also evaluating potential on-site mitigation for wetlands and streams, and hopes that many of these areas may be acceptable for wetland/stream impacts from construction of TIP No. A-9 B & C.

Tulula Creek Mitigation Site: A Unique NCDOT Project

By: Shannon Simpson
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Mountain fens are a unique and rare wetland type within the Southern Appalachian Mountains. Graham County, North Carolina is home to a biologically rich mountain fen that lies adjacent to Tulula Creek. This rare wetland as well as Tulula Creek were degraded by a failed attempt at building a golf course. In 1994 the North Carolina Department of Transportation (NCDOT) purchased the Tulula Creek site in order to restore the stream and fen to provide mitigation for the wetland and stream impacts of mountain transportation projects.

The Tulula Creek Mitigation site has provided more than just mitigation. It has fostered a symbiotic relationship between NCDOT and the University of North Carolina at Asheville (UNC-A). NCDOT awarded UNC-A a grant to conduct research at Tulula. Data was collected on the hydrological and biological characteristics of the fen and Tulula Creek before construction of the new stream channel began. Additional grant money provided by NCDOT will allow UNC-A to continue to collect data from the site after construction is complete. UNC-A's research will provide much of the monitoring information that NCDOT must include in its monitoring reports for the regulatory agencies.

In addition to benefiting DOT, the Tulula mitigation site has provided invaluable research and learning opportunities for UNC-A students and faculty in the Environmental Studies and Biology departments. Students have been able to gain hands on experience with research techniques such as amphibian and reptile collection and surveying plant diversity. Students have also been provided with a first hand knowledge of the process of stream and wetland restoration.

The information gathered by UNC-A will allow NCDOT to observe whether restoring the creek was successful in restoring the wetland. Monitoring the stability of the restored creek will reveal the success of the techniques used in restoring the creek. NCDOT will be able to determine if restoration increases the biological diversity and wildlife value of the site. Evaluation of this site will provide NCDOT with valuable information to incorporate into future mitigation projects.

Walls Benefit Everyone – Noise or Privacy

By: Steve Walker

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Invited Article: Featuring Articles from Other Units that Relate to Natural Systems.

Noise walls constructed by the North Carolina Department of Transportation (NCDOT) are the result of traffic noise analyses done in accordance with federal and state regulations. Existing noise measurements are taken to quantify the existing acoustical environment. Future noise levels for the completed projects are determined using computer models approved by the Federal Highway Administration. These future levels are evaluated and compared to existing levels to determine if traffic noise impacts can be expected as a result of construction of the proposed project. If traffic noise impacts are predicted, examination and evaluation of alternative noise abatement measures must be considered for reducing or eliminating the traffic noise impacts.

Noise barriers are extremely costly to construct – approximately \$1 million a mile with the costs coming directly from NCDOT transportation funds. Often, the public feels the barriers are too high, too low or not long enough. Also, most citizens believe traffic noise will be totally eliminated by the barrier, which is not the case. A noise wall is designed to mitigate traffic noise by providing a reasonable amount of attenuation to the noise.

NCDOT plans to construct a new roadway facility to extend Independence Boulevard from Oleander Drive to Randall Parkway in Wilmington. Noise barriers were recommended for three areas at an estimated cost of \$429,300. The total length of the three barriers was approximately 3412 feet with an approximate height of 11.5 feet. After the public involvement process was complete, each area requested noise walls to reduce the future traffic noise.

The City of Wilmington felt the noise barriers would create an undesirable visual affect along this major arterial roadway. City officials scheduled a public meeting for the citizens effected by the proposed NCDOT project. Several different types of walls were displayed. Since these walls would not provide the necessary noise reduction,



NCDOT could not participate in the cost. If constructed the city funds would have to be used to build these walls. After a series of meetings citizens agreed the City of Wilmington should build one of the 8-foot walls that were presented in lieu of the noise walls. City officials agreed that walls could be built in areas where noise walls were not recommended. This action was contingent on available funding. Final cost on replacing the noise walls was based on recommendation by NCDOT.

The Public's input led to the decision to construct walls to provide only visual screening. Noise walls normally provide visual screening and traffic noise reduction. The walls to be financed by the City of Wilmington are estimated to cost less than the noise walls recommended by the noise policy of NCDOT. The citizens were extremely happy with the selection, and having the opportunity to participated in the determination of the wall type. Additional walls may be built in areas not deemed reasonable for noise wall construction. If this occurs, NCDOT saves the cost of constructing noise walls along this project. Using this approach everyone benefited from the additional public involvement process.

Detours

Metric Conversions

Test your knowledge and correctly match the list of items to the corresponding metric conversion.

10 millipedes	2 paradigms
1012 microphones	1 terrapin
500 millinaries	1 diagram
106 bicycles	5 dialogues
2000 mockingbirds	1 megaphone
10 cards	1 terabull
454 graham crackers	1 seminary
1012 pins	2 megacycles
10 ⁻⁶ fish	1 pound cake
10 monologs	1 paradise
2 monograms	1 microfiche
8 nickels	2 kilomockingbirds
2 snake eyes	1 centipede
1012 bulls	1 decacards

2000 Annual Wetland Mitigation Monitoring Reports

By: Randy W. Griffin Jr.

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The Natural Systems Unit compiles annual monitoring reports for each of the Department's mitigation sites. Other units involved in the overall wetland mitigation monitoring process are the Geotechnical Unit and the Roadside Environmental Unit. In 2000, reports for 33 mitigation sites across the state were compiled. The reports provide relevant information needed to determine if a mitigation site has been successful.

Reports were distributed to representatives of the U.S. Army Corps of Engineers (Regional and Division offices), the North Carolina Division of Water Quality, the North Carolina Wildlife Resources Commission, the North Carolina Division of Coastal Management, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service during January, 2001. Copies were also distributed to various NCDOT staff. Two separate meetings were held on March 8, 2001 and March 16, 2001 to review the status of the individual sites with the various resource agencies. At these meetings, the resource agencies and NCDOT had an opportunity to comment on the success and/or failure of each mitigation site. The meetings are designed to provide NCDOT with guidance about the future monitoring of the site.

Two types of monitoring was conducted on a mitigation site: hydrologic and vegetative. The type monitoring required depends upon the success criteria set forth in the original mitigation plans and project permit conditions for highway projects, in which the mitigation sites are actually used. Hydrologic monitoring involves a system of gauges that collect daily measurements of groundwater levels. Rainfall data is also collected so that a comparison of rainfall and groundwater can be analyzed. Vegetative monitoring involves the identification of tree density and/or percentages of ground cover within various sample plot locations. Mitigation sites are deemed successful

only when both hydrologic and vegetative monitoring has met the prescribed minimum success criteria outlined in the mitigation plan, which is generally three to five years.

In an effort to provide a higher level of customer service, the Natural Systems Unit has placed each of the 2000 wetland mitigation monitoring reports on the PDEA/Natural Systems website. This system should continue to provide the monitoring reports to the various resource agencies in a timely manner. In addition, it should also reduce the costs of reproduction/distribution of each report in the future. The 2000 reports are located at the following web address: <http://www.doh.dot.state.nc.us/preconstruct/pe/naturalunit/Monitoring/2000Monitoring/default.html>

Agency Websites

Informative sites from the internet

For a concise history of NEPA and its pertenance, visit the EPA site at:
<http://www.epa.gov/history/topics/nepa/>

To visit the Federal Highways online Environmental Guidebook, go to:
<http://www.fhwa.dot.gov/environment/guidebook/contents.htm>

For an online English to Metric converter, visit the Science made simple Inc. site at:
<http://www.sciencemadesimple.com/conversions.html>

Detour Answers

10 millipedes	1 centipede
1012 microphones	1 megaphone
500 millinaries	1 seminary
106 bicycles	2 megacycles
2000 mockingbirds	2 kilomockingbirds
10 cards	1 decacards
454 graham crackers	1 pound cake
1012 pins	1 terrapin
10 ⁻⁶ fish	1 microfiche
10 monologs	5 dialogues

Employee Spotlight and Personnel Update

Charles R. Cox, P.E.

Charles Cox is originally from Dunn, North Carolina. He graduated from NCSU in 1988 with a Bachelor's Degree in Civil Engineering and is a registered Professional Engineer. His first professional job after graduation was for a land development company, where his primary jobs were bidding projects, tracking job costs, and managing construction projects throughout southeastern North Carolina.

Charles joined NCDOT, the Planning and Environmental Branch in 1990 and until 1998, he worked as a project planning engineer. In the fall of 1998, Charles transferred to the Natural Systems group. His role has been managing the design, construction, and monitoring of wetland and stream mitigation sites across the state. Much of his time has been spent on the Tulula Bog project in Graham County. His latest assignment is designing a stream restoration project for the Spring Valley Park in Greensboro.

Charles is married to Melanie, an audiologist/speech therapist. They have one daughter, Hannah, 1 1/2 years old. His hobbies include music, woodworking, furniture refinishing, and photography. He is the music director at his church.



Tim Bassette



Tim Bassette originally hails from Buffalo, New York. He received a Bachelor of Arts degree in biology and environmental studies from Alfred University in Western New York. Tim came to work for the Natural Systems Unit in 1998 as an Environmental Specialist. After completing his undergraduate degree, Tim received a Masters of Science degree in environmental science from the School of Public and Environmental Affairs at Indiana University with concentrations in water resources and hazardous materials management.

Tim accepted an internship with an environmental consulting firm in Indianapolis before moving to Washington D.C., where he worked for two years as an environmental regulatory consultant. At this position, Tim dealt with the Resource Conservation Recovery Act (RCRA), the hazardous materials site clean-up foundation, and the Emergency Planning Community Right-to-Know Act (EPCRA).

Tim's previous work experience makes him a valuable resource. He participates in environmental planning and performs natural resource investigations, including wetland delineations, stream determinations, and environmental species investigations.

Outside of work, Tim volunteers with the Raleigh Jaycees, participates in the Wake County Young Democrats organization, plays in a city soccer league, and is involved with his church's youth group. He also enjoys weight lifting and jogging.

Mr. Randy Turner was recently named Bio-Team Unit leader in the Natural Systems Unit of the PDEA Branch. As a Bio-Team leader, Randy's responsibilities include managing, organizing and supervising environmental planning studies.

Randy received his formal education from the University of South Carolina (BS-Biology) and Western Carolina University (MS-Biology). Having worked in environmental related issues both in the private and public sector, he brings a solid understanding of NEPA and the environmental regulatory and permitting process to the Unit. An 11-year employee with NCDOT, his initial appointment was Head of the Natural Resources Section from 1990 to 1995. In 1995 he accepted a field position in Division 1 as a Division Environmental Officer providing environmental leadership in both construction and maintenance activities. In 1999 he moved to Division 3 in a similar role. Randy, congratulations on your promotion! We welcome you back to Raleigh and the PDEA Branch.

Randy has been married for 36 years to Jane, a very talented artist, who is originally from Spencer, N.C. He has two children-Alison and Paul and one grandchild, Gwynneth. Randy's hobbies are cooking, fishing, gardening, eating, hiking, kayaking, and foraging. He also reads a lot and is a news junky.

Randy Turner New Bio-Team Leader



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Our Mission Statement

Each of the teams in the Natural Systems Unit is responsible for natural resources investigation, obtaining environmental permits, developing wetland and stream mitigation plans, and implementing the construction of mitigation sites.

500 copies of this newsletter were produced by the North Carolina Department of Transportation at a cost of \$.29 each.

NC Department of Transportation
P. O. Box 25201
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Raleigh NC 27611